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ABSTRACT

This is a part of the Manitoba Mathematics Assessment Program 1987. Actual testing material and the manual for grade 12 are provided. The test (39 items) requires 90 minutes to be taken. Part A (31 items) has core items for every student and Part B has optional items on which students write only two sections (8 items) from those designated by the teachers. The manual describes general testing instructions, administration, scoring method and key, and format for recording the final test scores. (YP)

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ED301430

№ 03650

MATHEMATICS ASSESSMENT PROGRAM 1987

CURRICULUM DEVELOPMENT AND IMPLEMENTATION BRANCH

GRADE 12-300

U.S. DEPARTMENT OF EDUCATION
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JUNE, 1987

Manitoba Education

SE 050 149

GENERAL INSTRUCTIONS

THIS TEST CONSISTS OF TWO PARTS:

PART A - CORE - 31 ITEMS, WRITTEN BY EVERYONE

PART B - OPTIONS - IN THIS PART YOU WILL WRITE ONLY THOSE **TWO** SECTIONS DESIGNATED BY YOUR TEACHER. EACH SECTION CONTAINS 4 ITEMS.

ALL QUESTIONS ARE TO BE ANSWERED ON THE ANSWER SHEETS PROVIDED. CALCULATORS MAY BE USED. THERE IS AMPLE SPACE IN THE TEST BOOKLET FOR SCRATCH WORK.

BE SURE TO READ THE INSTRUCTIONS CAREFULLY FOR EACH SECTION AND TO USE THE APPROPRIATE PART OF THE ANSWER SHEET.

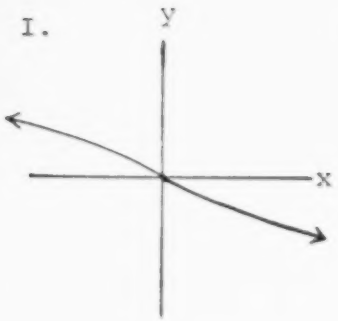
DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

PART A

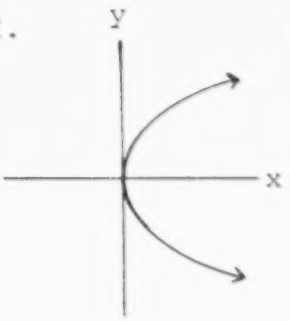
BEGIN WITH SPACE NUMBER 1 ON YOUR ANSWER SHEET.

1 Which of the following graphs represent functions?

I.



II.



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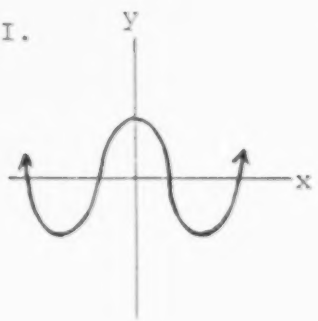

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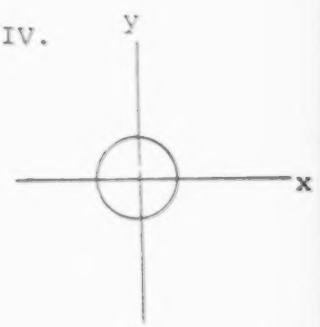
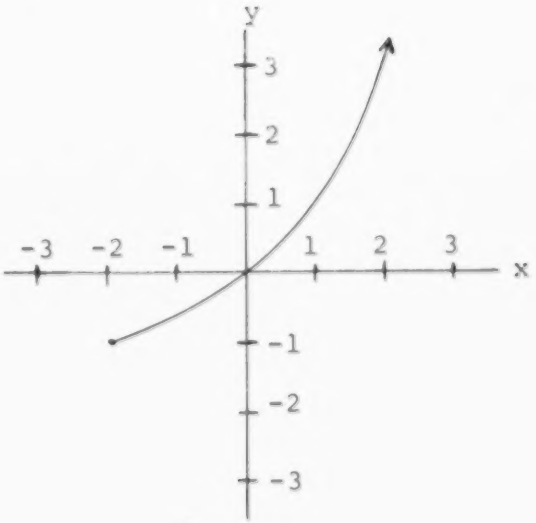


A) I
B) II
C) II, IV
D) I, II, III
E) I, III

2 The range of the function shown in this graph is

A) all real numbers
B) $\{y|y\geq -2\}$
C) $\{y|y\geq -1\}$
D) $\{y|y\geq 0\}$
E) $\{y|y\leq -1\}$



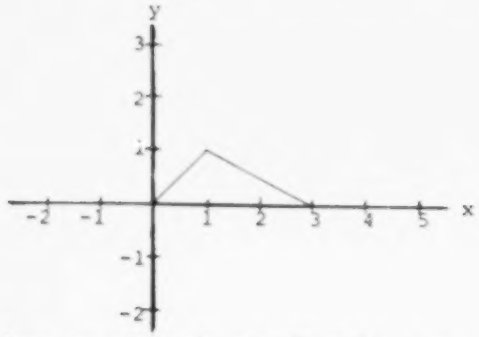
3 The zero(s) of the function $f(x) = \sqrt{x-9} - 4$ is(are)

A) 5
B) 7
C) 25
D) -7,25
E) empty set

4 An equation of the inverse of $f(x) = 2x + 1$ is

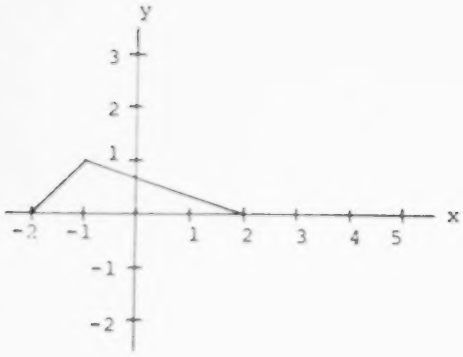
A) $g(x) = \frac{x}{2} - 1$
B) $g(x) = \frac{x-1}{2}$
C) $g(x) = \frac{x+1}{2}$
D) $g(x) = \frac{x}{2} + 1$
E) $g(x) = 2x - 1$

5 If the graph of the function y=f(x) is



then a sketch of f(x-2) is

A)



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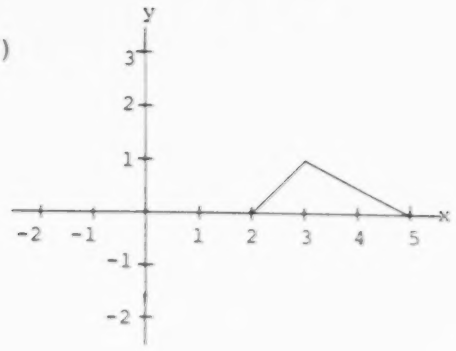
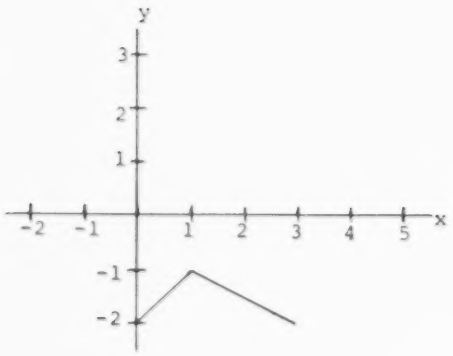


C)



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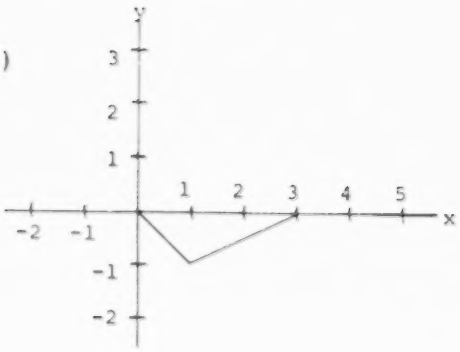
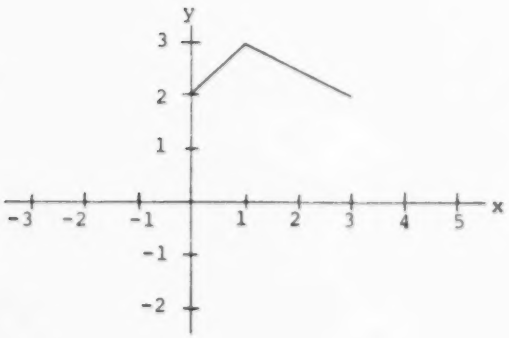


E)



6 An equation of a polynomial p(x) with zeros 2, 5, -1 is

A) $p(x) = (x+2)(x+5)(x-1)$

B) $p(x) = \frac{(x+2)(x+5)}{(x-1)}$

C) $p(x) = (x-2)(x-5)(x+1)$

D) $p(x) = \frac{(x-2)(x-5)}{(x+1)}$

E) $p(x) = 2x^2 + 5x - 1$

7 If $f(x) = 3-x^2$ and $g(x) = \sqrt{6-x}$ then the value of $g(f(1))$ is

A) 2

B) -2

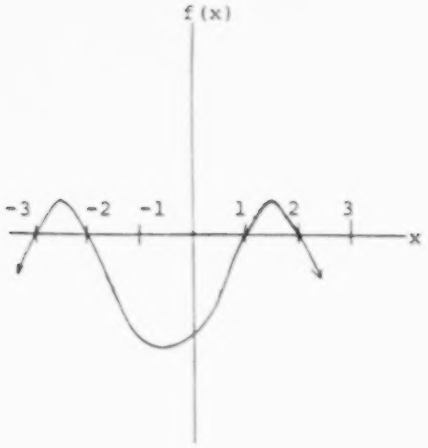
C) ± 2

D) $\sqrt{5}$

E) 5

8 A sketch of $f(x) = -3(x+1)(x-2)(x+2)^2$ is

A)



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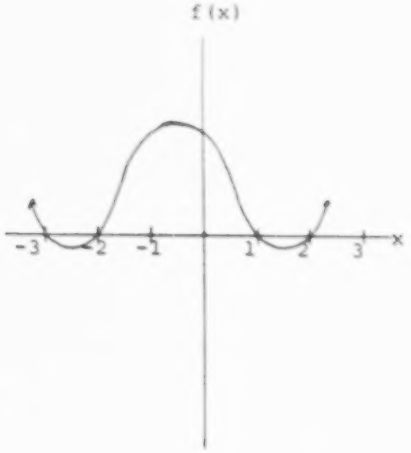

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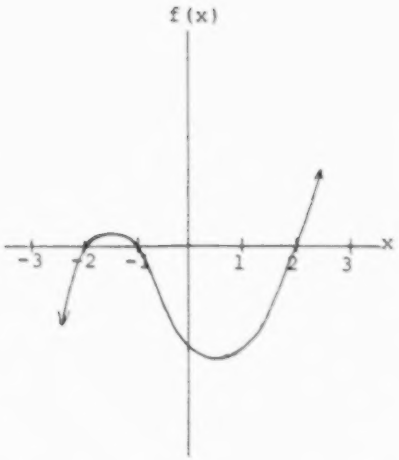

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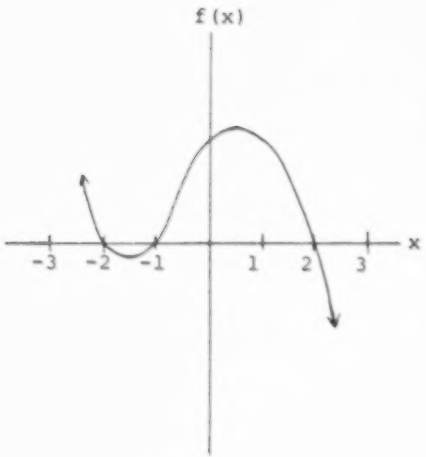

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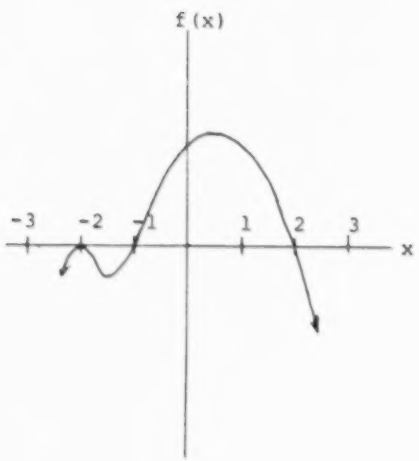
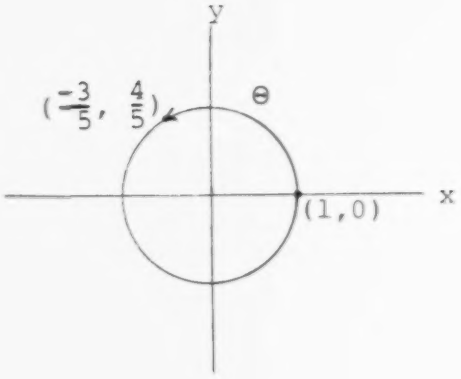


9 Let θ be the arc length on the unit circle from the point (1,0) to the point $P(\theta) = (\frac{-3}{5}, \frac{4}{5})$. The value of $\tan \theta$ is



A) $\frac{-3}{5}$

B) $\frac{4}{5}$

C) $\frac{-3}{4}$

D) $\frac{-4}{3}$

E) $\frac{-5}{3}$

10 The exact value of $\sin \frac{16\pi}{3}$ is

A) $\frac{\sqrt{3}}{2}$

B) $\frac{1}{2}$

C) $\frac{-\sqrt{3}}{2}$

D) $\frac{-1}{2}$

E) $\frac{\sqrt{2}}{2}$

11 If $\sin \theta = 0.3$, then the exact value of $\cos \theta$ is

A) ± 0.3

B) $\sqrt{0.91}$

C) $\pm\sqrt{0.91}$

D) $\sqrt{0.1}$

E) $\pm\sqrt{0.1}$

12 If $\sin \theta = \frac{1}{2}$ and $\tan \theta < 0$, then a possible exact value of θ is

A) $\frac{\pi}{6}$

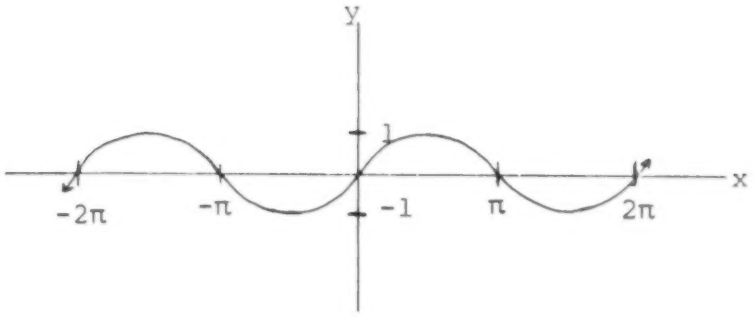
B) $\frac{\pi}{3}$

C) $\frac{2\pi}{3}$

D) $\frac{5\pi}{6}$

E) 0.5236

13



An equation of the above curve is

A) $y = \sin x$

B) $y = \cos x$

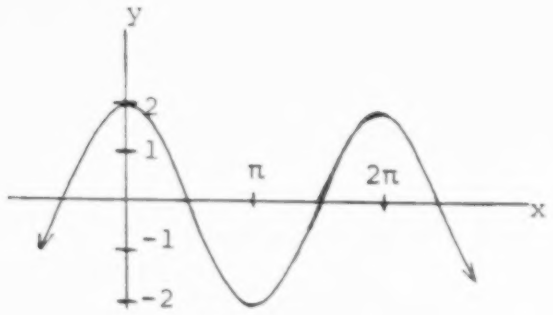
C) $y = \tan x$

D) $y = -\cos x$

E) $y = \sec x$

14 A sketch of $y = 2\cos 2x$ is

A)



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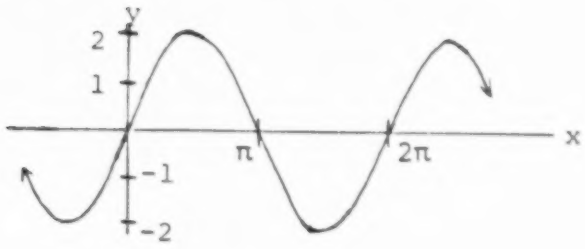

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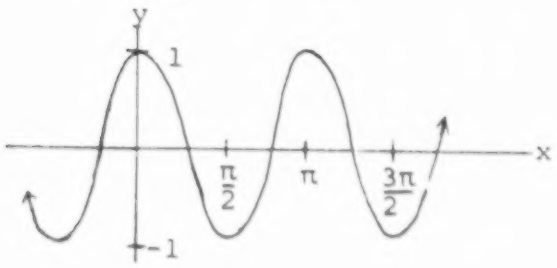

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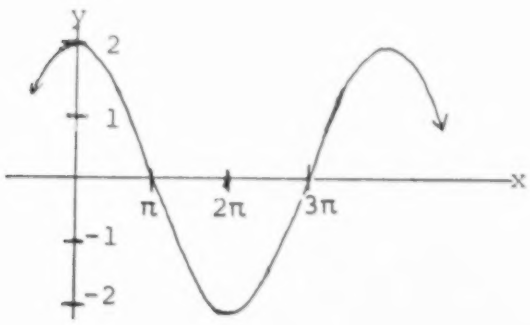

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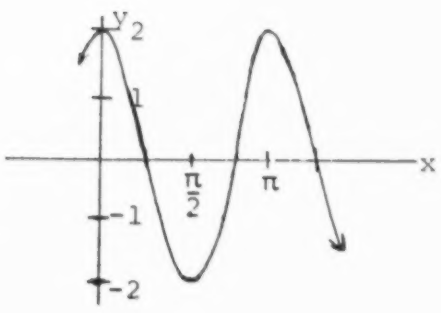


15 The domain of $y = \tan x$ is

A) $\{x | x \text{ is a real number}\}$

B) $\{x | x \neq k\pi, k \text{ is an integer}\}$

C) $\{x | x \neq \frac{k\pi}{4}, k \text{ is an integer}\}$

D) $\{x | x \neq \frac{k\pi}{2}, k \text{ is an integer}\}$

E) $\{x | x \neq (2k+1)\frac{\pi}{2}, k \text{ is an integer}\}$

16 An expression equivalent to $\frac{\cos x - 1}{\cos x \sin x} + \frac{\sin x}{\cos x}$ is

A) $\frac{-1}{\cos x}$

B) $\frac{-1}{\sin x}$

C) $\frac{1+\cos x}{\sin x}$

D) $\frac{1-\cos x}{\sin x}$

E) $\frac{\cos x - \cos^2 x}{\sin x}$

17 If $0° \leq \theta \leq 360°$, then the exact values of θ which satisfy the equation $(\sin \theta)(2\cos \theta - 1) = 0$ is

A) 0°, 60°, 120°, 180°
B) 0°, 60°, 180°, 300°, 360°
C) 0°, 60°, 120°, 180°, 360°
D) 180°, 240°, 300°
E) 0°, 180°, 240°, 300°, 360°

18 From the top of a 20 m tower the angle of depression of an approaching dog is 70°. Assuming the ground around the tower to be perfectly level, the distance from the dog to the base of the tower is approximately

A) 6.8 m
B) 7.3 m
C) 18.8 m
D) 21.3 m
E) 54.9 m

19 Brandon is 210 km west of Winnipeg. Dauphin is 160 km N15°E of Brandon. The direct distance from Winnipeg to Dauphin is approximately

A) 69 km
B) 88 km
C) 229 km
D) 262 km
E) 295 km

20 Triangle ABC is formed by drawing segments joining A(6,2), B(2,1), and C(5,5). The length of the altitude from A is

A) $\frac{13}{5}$

B) $\sqrt{10}$

C) $\sqrt{17}$

D) 5

E) $\sqrt{85}$

21 The equation of the locus of all points equidistant from (1,0) and from the line whose equation is $x + y = 4$ is

A) $x^2 + y^2 - 2xy + 4x + 8y - 14 = 0$

B) $x = 4y^2$

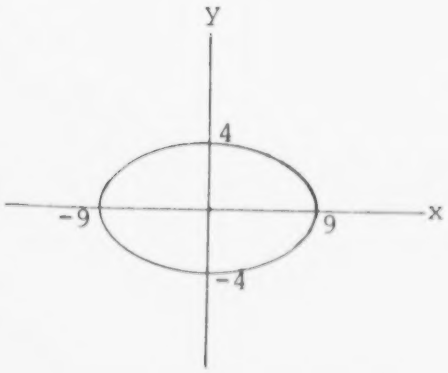
C) $y = 4x^2$

D) $x + y = \frac{5}{2}$

E) $x = \frac{3}{\sqrt{2}}$

22 A sketch of the graph of $\frac{x^2}{9} + \frac{y^2}{4} = 1$ is

A)



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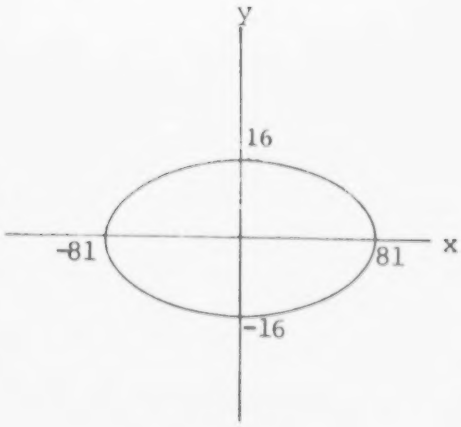

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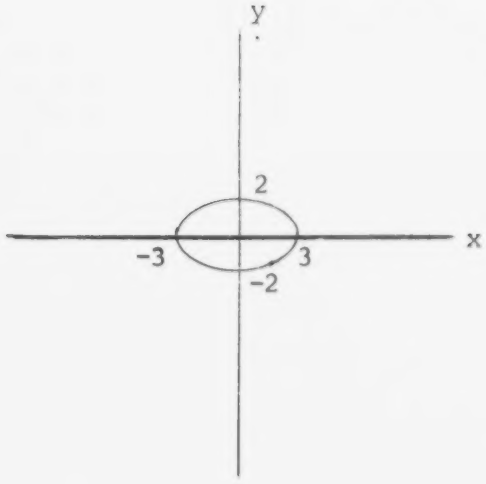

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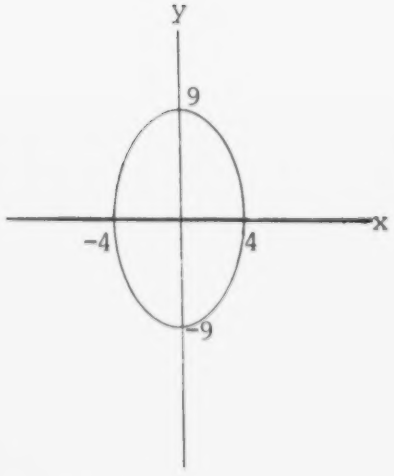
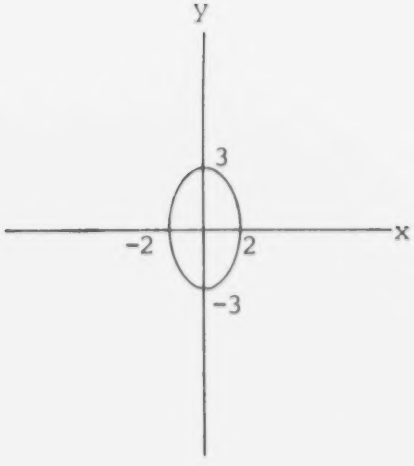


E)

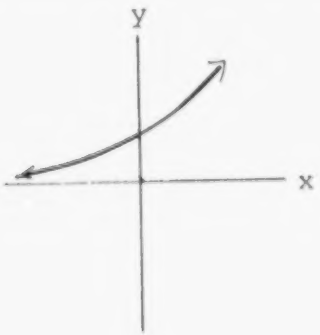


(23) The centre of the circle with equation $(x-1)^2 + y^2 + 6y = 0$ is

A) (1,3)
B) (1,-3)
C) (1,6)
D) (1,-6)
E) impossible to find since the equation does not represent a circle

(24) A sketch of the graph of $y = 3^{-x}$ is

A)



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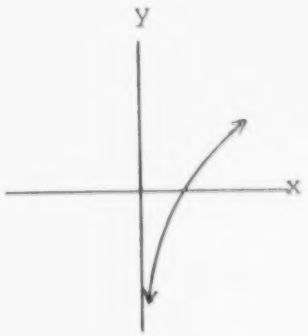

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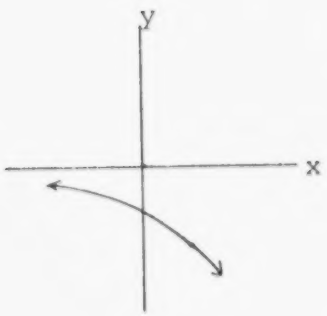
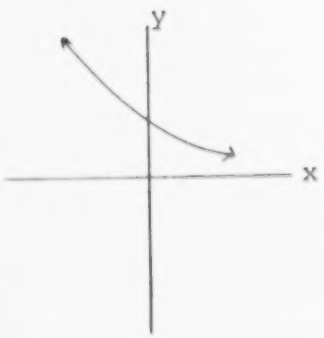
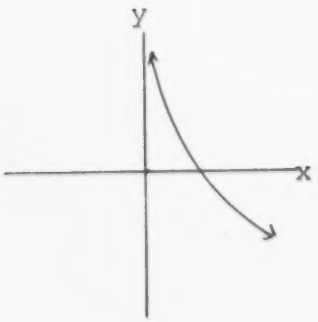


D)



E)



(25) $2\log A - \log B + \frac{1}{2}\log C$ is equivalent to

A) $\frac{(A^2)\sqrt{C}}{B}$

B) $\frac{A^2}{B\sqrt{C}}$

C) $\log \frac{(A^2)\sqrt{C}}{B}$

D) $\log \frac{A^2}{B\sqrt{C}}$

E) $\log (2A - B + \frac{1}{2}C)$

(26) If $\log_3 x - \log_3 (x + 6) = -1$, then a solution for x is

A) 3

B) $\frac{9}{2}$

C) -3

D) -9

E) impossible, since a logarithmic expression cannot have a negative value

(27) Suppose the number of bacteria in a certain culture T hours from now will be $100(2.5)^T$. The bacteria count will reach 600 in approximately

A) 2 hr.
B) 3 hr.
C) 7 hr.
D) 24 hr.
E) 240 hr.

28 The sequence defined by the recursive formula $t_1 = 7$, $t_n = 2t_{n-1}$ is

A) 7, 9, 11, . . .

B) 7, 14, 28,. . .

C) 7, 49, 343, . .

D) $7, \frac{7}{2}, \frac{7}{4}, \ldots$

E) 7, 5, 3,. . . .

29 If 81,A,B,C,16 is a geometric sequence, then the value of B is

A) 36

B) ± 36

C) 48.5

D) ± 48.5

E) $\sqrt{97}$

30 The sum of the first fifty terms of the series

$88 + 82 + 76 + \ldots$ is

A) -11 750

B) - 2 950

C) 3 450

D) 4 400

E) 11 750

(31) If the sum to infinity of a convergent geometric sequence is 16 and the common ratio is -0.5, then the value of the first term of the sequence is

A) 4

B) 8

C) $\frac{32}{3}$

D) 24

E) 32

END OF PART A

IN PART B DO ONLY THOSE TWO OPTIONS INDICATED BY YOUR TEACHER:

	OPTION	PAGE	ITEMS
I.	BINOMIAL THEOREM.	18	35-38
II.	COMPOUND INTEREST, ANNUITIES. . .	20	41-44
III.	GRAPHS OF SINUSOIDAL FUNCTIONS. .	22	51-54
IV.	CIRCULAR FUNCTIONS OF TWO ANGLES.	25	61-64
V.	PERMUTATIONS AND COMBINATIONS . .	27	71-74
VI.	CONIC SECTIONS IN STANDARD POSITION	29	81-84
VII.	TRANSFORMATIONS OF CONICS	31	91-94

EACH SECTION BEGINS ON A NEW PAGE. READ INSTRUCTIONS CAREFULLY.

GO ON TO PART B.

PART B - OPTION I.

BINOMIAL THEOREM

BEGIN THIS SECTION IN SPACE NUMBER 35 ON YOUR ANSWER SHEET.

(35) The value of $\frac{80!}{78!}$ is

A) (80)(79!)

B) 2

C) 6320

D) $\frac{40!}{39!}$

E) 40

(36) $(x-2y)^4$ is e ual to

A) $x^4 + 2x^3y + 4x^2y^2 + 8xy^3 + 16y^4$

B) $x^4 - 2x^3y + 4x^2y^2 - 8xy^3 + 16y^4$

C) $x^4 + 8x^3y + 24x^2y^2 + 32xy^3 + 16y^4$

D) $x^4 - 8x^3y + 24x^2y^2 - 32xy^3 + 16y^4$

E) $x^4 + 16y^4$

Option I (Cont'd.)

37 The numerical coefficient of the tenth term of $(m + r)^{40}$ is

A) $\frac{40!}{31!9!}$

B) $\frac{40!}{30!10!}$

C) $\frac{40!}{29!11!}$

D) $\frac{40!}{9!}$

E) $\frac{40!}{10!}$

38 The fifth term of the expansion of $(2x-y)^{10}$ is

A) $-32x^5y^5$

B) $-6720x^5y^5$

C) $16x^4y^6$

D) $64x^6y^4$

E) $13440x^6y^4$

END OF OPTION I.

GO TO YOUR OTHER OPTION SECTION. IF YOU HAVE ALREADY COMPLETED TWO OPTION SECTIONS, USE THE REMAINING TIME TO CHECK YOUR WORK ON ANY PART OF THE TEST.

PART B - OPTION II

COMPOUND INTEREST, ANNUITIES, . . .

BEGIN THIS SECTION IN SPACE NUMBER 41 ON YOUR ANSWER SHEET.

(41) You require $5000.00 three years from today. The amount of money you must invest today, at 10% compounded annually, in order to accumulate this amount is approximately

A) $ 167.00
B) $1667.00
C) $2218.00
D) $3756.00
E) $6655.00

(42) In 1988 you will begin to make $100.00 deposits on each January 2 and July 2 with a bank that pays interest at 8% per annum compounded semi-annually. If you make no withdrawals, the amount you will have accumulated in this account right after the January 2, 1995 deposit is

A) $\$100\frac{(1.04)^{7}-1}{0.04}$

B) $\$100\frac{(1.04)^{14}-1}{0.04}$

C) $\$100\frac{(1.04)^{15}-1}{0.04}$

D) $\$100\frac{(1.08)^{7}-1}{0.08}$

E) $\$100\frac{(1.08)^{14}-1}{0.08}$

Option II (Cont'd.)

43 A man wishes to accumulate \$10 000.00 by making equal deposits in a bank at the end of each year for 10 years. If money earns interest at 8% per annum compounded annually then the value of each deposit is

A) $\$10000(1.08)^{-10}$

B) $\$10000(1.08)^{10}$

C) $\dfrac{\$10000(0.08)}{(1.08)^{10}-1}$

D) $\dfrac{\$10000[(1.08)^{10}-1]}{0.08}$

E) $\dfrac{\$10000[1-(1.08)^{-10}]}{0.08}$

44 You wish to deposit enough money today so that you can withdraw \$3000.00 at the end of each year for 5 years. Your first withdrawal will be made one year from now. If money earns 10% compounded annually, the amount you must invest today is

A) $\$15000(1.1)^{-5}$

B) $\dfrac{\$3000(0.1)}{(1.1)^{5}-1}$

C) $\dfrac{\$3000[(1.1)^{5}-1]}{0.1}$

D) $\dfrac{\$3000[1-(1.1)^{-5}]}{0.1}$

E) $\dfrac{\$3000[1-(1.1)^{-6}]}{0.1}$

END OF OPTION II

GO TO YOUR OTHER OPTION SECTION. IF YOU HAVE ALREADY COMPLETED TWO OPTION SECTIONS, USE THE REMAINING TIME TO CHECK YOUR WORK ON ANY PART OF THE TEST.

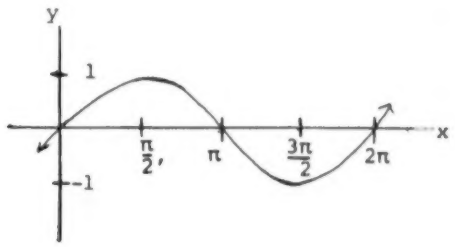
PART B - OPTION III

GRAPHS OF SINUSOIDAL FUNCTIONS

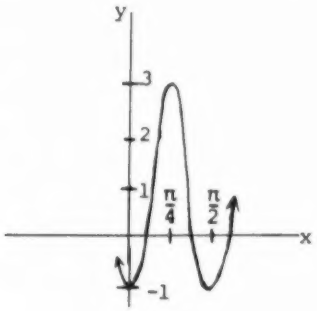
BEGIN THIS SECTION IN SPACE NUMBER 51 ON YOUR ANSWER SHEET.

(51) The sketch of $y = -2\sin 4x + 1$ is

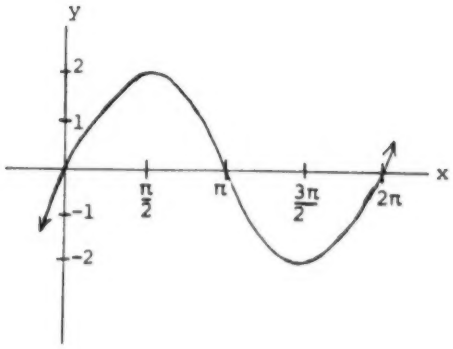
A)



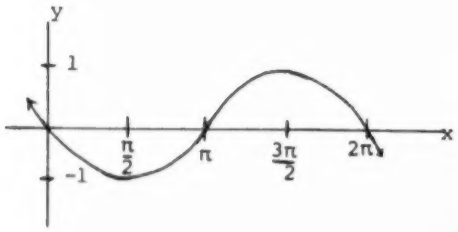
B)



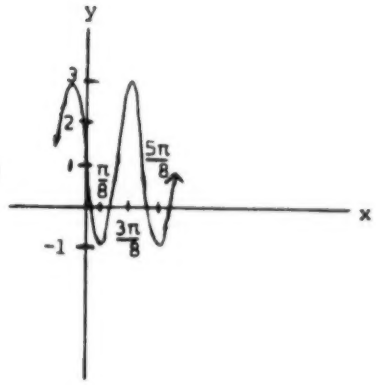
C)



D)

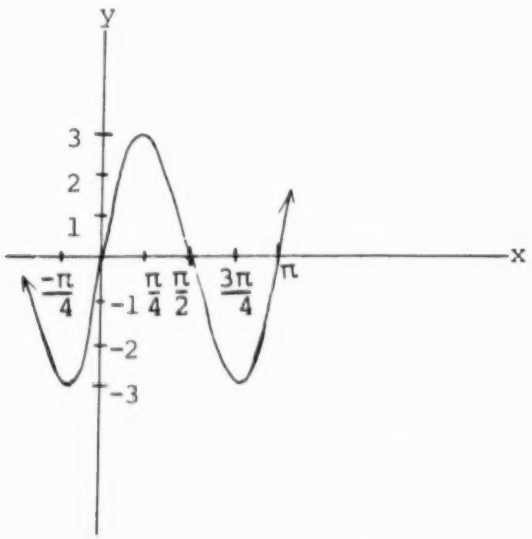


E)



Option III (Cont'd.)

52



An equation of the above curve is

A) $y = 3\cos x$

B) $y = 3\sin 2x$

C) $y = 3\cos 2x$

D) $y = 3\sin x$

E) $y = 3\cos(\frac{x}{2})$

53 A ferris wheel with a radius of 5 m makes one complete revolution every 30 seconds. From where you are now, it takes 3 seconds to reach the top, 11 m above the ground. An equation which shows how your height (h) above the ground varies with time (t) is

A) $h = 6 + 5\cos 30(t-3)$

B) $h = 11 + \cos \frac{\pi}{15}(t+3)$

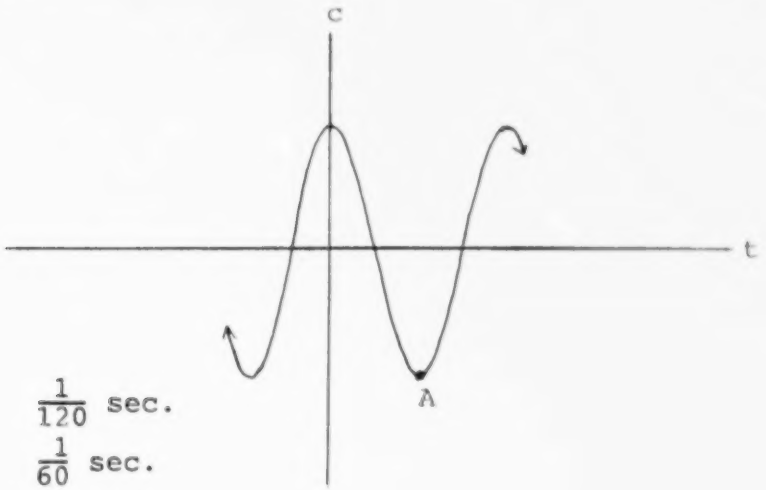
C) $h = 11 + \cos 60\pi(t+3)$

D) $h = 6 + 5\sin \frac{\pi}{15}(t+3)$

E) $h = 6 + 5\cos \frac{\pi}{15}(t-3)$

Option III (Cont'd.)

54 The strength of the current supplying the electricity to your house varies sinusoidally with time. The frequency of the sinusoid is 60 cycles per second. Suppose, at time t=0 seconds, the current is at its maximum of 6 amperes. If the graph below is a representation of the above relationship between c (current in amperes) and t (time in seconds), then the value of t at point A is



A) $\frac{1}{120}$ sec.

B) $\frac{1}{60}$ sec.

C) $\frac{1}{30}$ sec.

D) 30 sec.

E) 60 sec.

END OF OPTION III

GO TO YOUR OTHER OPTION SECTION. IF YOU HAVE ALREADY COMPLETED TWO OPTION SECTIONS, USE THE REMAINING TIME TO CHECK OVER YOUR WORK ON ANY PART OF THE TEST.

PART B - OPTION IV

CIRCULAR FUNCTIONS OF TWO ANGLES

BEGIN THIS SECTION IN SPACE NUMBER 61 ON YOUR ANSWER SHEET.

(61) The exact value of $\cos^2 \frac{\pi}{12}$ is

A) 0.933

B) $\frac{2+\sqrt{3}}{4}$

C) $\frac{2-\sqrt{3}}{4}$

D) $\frac{7+4\sqrt{3}}{16}$

E) $\frac{\sqrt{2}-\sqrt{6}}{4}$

(62) $-\cos(\frac{\pi}{2}-A)$ is equivalent to

A) sin A
B) -sin A
C) cos A
D) -cos A
E) sec A

(63) sin 10x is equivalent to

A) 10 sin x
B) 5 sin 2x
C) 2 sin 5x cos 5x
D) 20 sin x cos x
E) 50 sin x cos x

Option IV (Cont'd.)

64 The measure of the acute angle of intersection of the lines $2x - y + 5 = 0$ and $x + y + 2 = 0$ is approximately

A) 1°
B) 18°
C) 60°
D) 72°
E) 90°

END OF OPTION IV

GO TO YOUR OTHER OPTION SECTION. IF YOU HAVE ALREADY COMPLETED TWO OPTION SECTIONS, USE THE REMAINING TIME TO CHECK YOUR WORK ON ANY PART OF THE TEST.

PART B - OPTION V

PERMUTATIONS AND COMBINATIONS

BEGIN THIS SECTION IN SPACE NUMBER 71 ON YOUR ANSWER SHEET.

(71) There are five teams in the Western Conference of the CFL. If Winnipeg finishes in first position, the other four positions can be filled in

A) 4 ways
B) 6 ways
C) 10 ways
D) 24 ways
E) 120 ways

(72) The number of ways of seating five students in a classroom containing thirty desks is

A) 30

B) 25

C) $\frac{30!}{25!}$

D) $\frac{30!}{5!}$

E) $\frac{30!}{25!5!}$

(73) The number of ways of arranging 3 English, 2 French, and 4 Ukrainian books on a shelf so that the books of the same language are together is

A) 72
B) 144
C) 288
D) 1260
E) 1728

Option V (Cont'd.)

74 A committee of 5 is to be selected from 8 boys and 7 girls. The number of different committees consisting of 2 boys and 3 girls is

A) 980
B) 3003
C) 11 760
D) 117 600
E) 360 360

END OF OPTION V

GO TO YOUR OTHER OPTION SECTION. IF YOU HAVE ALREADY COMPLETED TWO OPTION SECTIONS, USE THE REMAINING TIME TO CHECK YOUR WORK ON ANY PART OF THE TEST.

PART B - OPTION VI

CONIC SECTIONS IN STANDARD POSITION

BEGIN THIS SECTION IN SPACE NUMBER 81 ON YOUR ANSWER SHEET.

81 The length of the minor axis of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ is

A) 3
B) 4
C) 6
D) 9
E) 16

82 An ellipse with centre at the origin passes through the points $(1, 2\sqrt{3})$ and $(\sqrt{3}, 2)$. An equation of this ellipse is

A) $\frac{x^2}{1} + \frac{y^2}{12} = 1$

B) $\frac{x^2}{3} + \frac{y^2}{4} = 1$

C) $\frac{x^2}{12} + \frac{y^2}{1} = 1$

D) $\frac{x^2}{4} + \frac{y^2}{3} = 1$

E) $\frac{x^2}{4} + \frac{y^2}{16} = 1$

83 An equation of an asymptote of the hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = 1$ is

A) $4x - 3y = 0$
B) $4x + 3y = 1$
C) $16x + 9y = 0$
D) $16x - 9y = 1$
E) $4x - 3y = 1$

Option VI (Cont'd.)

84 The focus of the conic $y^2 = 8x$ is

A) (8,0)

B) (2,0)

C) $(\frac{1}{2},0)$

D) $(\frac{1}{4},0)$

E) $(\frac{1}{8},0)$

END OF OPTION VI

GO TO YOUR OTHER OPTION SECTION. IF YOU HAVE ALREADY COMPLETED TWO OPTION SECTIONS, USE THE REMAINING TIME TO CHECK YOUR WORK ON ANY PART OF THE TEST.

PART B - OPTION VII

TRANSFORMATION OF CONICS

BEGIN THIS SECTION IN SPACE NUMBER 91 ON YOUR ANSWER SHEET.

(91) A focus of the ellipse $\frac{x^2}{9} + \frac{y^2}{25} = 1$ is

A) (0,-4)
B) (0,-5)
C) (5,0)
D) (3,0)
E) (9,25)

(92) An equation of a parabola with vertex (-2,3) and axis of symmetry y = 3 is

A) $y = (x+2)^2 + 3$

B) $(y-3) = 3(x+2)^2$

C) $(x+2) = -5(y-3)^2$

D) $y = 3x^2 - 9$

E) $(x-2) = 12(y+3)^2$

(93) The centre of the conic section

$2x^2 - 3y^2 + 4x - 6y - 11 = 0$ is

A) (1,1)
B) (-1,-1)
C) (-2,3)
D) (2,-3)
E) (4,-6)

Option VII (Cont'd.)

(94) An equation of the hyperbola with vertex $(-1,-2)$ and asymptotes $3(x-1) = \pm 2(y+2)$ is

A) $\frac{(x-1)^2}{4} - \frac{(y+2)^2}{9} = 1$

B) $\frac{(x-1)^2}{2} - \frac{(y+2)^2}{3} = 1$

C) $\frac{(x+1)^2}{4} - \frac{(y+2)^2}{9} = 1$

D) $\frac{(x+1)^2}{2} - \frac{(y+2)^2}{3} = 1$

E) $\frac{(x+1)^2}{9} - \frac{(y+2)^2}{4} = 1$

END OF OPTION VII

GO TO YOUR OTHER OPTION SECTION. IF YOU HAVE ALREADY COMPLETED TWO OPTION SECTIONS, USE THE REMAINING TIME TO CHECK YOUR WORK ON ANY PART OF THE TEST.

MATHEMATICS ASSESSMENT PROGRAM 1987

GRADE 12 MATHEMATICS 300

MANUAL AND SCORING KEY

Note to Mathematics-300 Teachers

This mathematics test includes questions from the 7 option sections of the course (see test, p.17 and page 4 of this Manual). Students are to answer questions from **2 options only**. The mathematics teachers are to designate to their students which 2 options they want them to answer. We suggest that this be done during test administration time before the actual testing begins. It is a good idea to list the 2 option numbers and titles along with item numbers conspicuously on the chalkboard. See item 7, page 2 of this Manual for special coding in this regard.

JUNE, 1987

Manitoba
Education

SE 050 149

GENERAL INSTRUCTIONS

This test consists of two parts:

PART A - Core - 31 items, written by everyone

PART B - Options - In this part students write only those **TWO** sections designated by the teacher. Each section contains 4 items.

The test requires 90 minutes of writing time to complete. In addition, 10-15 minutes are needed for administration time. There is no break during the test.

1. Please read all instructions carefully before administering the test.
2. Students will respond to all questions on NCS answer sheets.
3. **YOU** must designate the two option sections which students are to write. This should be done before the actual test begins.
4. Detailed instructions for administering the test appear on pages 2 and 3 of the Manual.
5. Students must use pencils for answering questions. Ball point pens must **NOT** be used.
6. Calculators and/or mathematics tables are permitted for all parts of the test. Scratch work may be done in the test booklets.
7. There is no penalty for guessing. Students may guess if they are not completely sure of the right answer.

Required Materials

1. Mathematics 300 Manual and Scoring Key
2. Student test booklets
3. Answer sheets
4. Soft lead pencils and erasers (school or student supplied)
5. Math tables or calculators (school or student supplied)

ADMINISTERING THE TEST

1. Describe the nature and length of the test and the testing procedure to the students.

2. Remind students that in PART B, they are to write only **TWO** of the option sections. Write the names of these sections on the board.

3. Pass out the answer sheets. Each student should have at least two sharpened pencils and an eraser. There is ample room in the test booklets for scratch work but you may provide scratch paper if you wish.

4. **CODING - NAME AND SEX**
   Pass out the answer sheets. Instruct students to:

   a) Print their names in the boxes provided at the top left corner of side 1. Do not have them blacken the circles underneath the letters.

   b) Blacken the appropriate circles for sex and grade.

5. Instruct students **NOT** to open their test booklets until told to do so. Pass out test booklets.

6. **CODING - BOOKLET NUMBER AND SCHOOL NUMBER**
   a) Each test booklet has a unique 5-digit booklet number. Instruct students to print their test booklet number in the "Identification Number" boxes A-E of the answer sheet and to blacken the appropriate circles.

   b) Each school has a unique 4-digit school code. Your school code is with your testing materials. Instruct students to write this code in the "Special Codes" boxes K-N of the answer sheets and to blacken the appropriate circles.

7. **CODING - OPTION NUMBERS**
   Instruct students to write the Arabic numbers of the **TWO** designated options in the "Special Codes" boxes O-P of the student answer sheets and to blacken the appropriate circles. These two selected options are the only two that will be scored for assessment purposes (see p.4 for option numbers).

   Please verify that all coding has been done correctly.

8. Have the students read the "General Instructions" on page 1 of the test booklet. Make certain that students are familiar with the use of the NCS answer sheets.

READ ALOUD

All answers are to be marked on your answer sheet. Blacken the circle that corresponds to your answer. If you wish to change an answer, be sure to erase your first answer completely. Each question has only one correct answer; try your best even if you are not completely sure.

9. Have students turn to page 2 of the test booklet and begin. Note the starting time. (Please check to see that students are on the appropriate part of the answer sheet.)

10. At the end of 90 minutes testing time, instruct students to stop. Collect all test booklets and answer sheets. Place the answer sheets in the envelope provided.

11. Booklets may be retained by the school for future use.

12. Return mailing instructions have been given to principals.

SCORING - MATHEMATICS 300

It is recommended that the tests be scored according to topical subtests because these are more meaningful than a total test score. C refers to topics in the Core, O refers to Options.

Item Number	Correct Answer
C.I Polynomials & Rat'l Fcns.	
1	E
2	C
3	C
4	B
5	B
6	C
7	A
8	E
C.II Circular Functions	
9	D
10	C
11	C
12	D
13	A
14	E
15	E
16	D
17	B
18	B
19	C
C.III Analytic Geometry	
20	A
21	A
22	C
23	B
C.IV Exponents & Logarithms	
24	D
25	C
26	A
27	A
C.V Sequences & Series	
28	B
29	A
30	B
31	D

Item Number	Correct Answer
O.I Binomial Theorem	
35	C
36	D
37	A
38	E
O.II Compound Interest	
41	D
42	C
43	C
44	D
O.III Sinusoidal Functions	
51	E
52	B
53	E
54	A
O.IV Circular Functions	
61	B
62	B
63	C
64	D
O.V Perms and Combs	
71	D
72	C
73	E
74	A
O.VI Conic Sections	
81	C
82	E
83	A
84	B
O.VII Transformations of Conics	
91	A
92	C
93	B
94	A

MATHEMATICS ASSESSMENT PROGRAM 1987
FINAL TEST SCORES - GRADE 12-300

Subtests and Number of Items per Subtest:

Student Names	CORE					OPTIONS						
	Subtest					O.I	O.II	O.III	O.IV	O.V	O.VI	O.VII
	$C1_{8}$	CII_{11}	$CIII_{4}$	CIV_{4}	CV_{4}	4	4	4	4	4	4	4